

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



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PARTICIPANT

University of Kentucky Research
Foundation
Lexington, KY

LOCATION

Kentucky Utilities
Ghent Power Station
Ghent, Carroll County, KY



Clean Coal Power
Initiative (CCPI)

03/2004

ADVANCED MULTI-PRODUCT COAL UTILIZATION BY-PRODUCT PROCESSING PLANT

Project Description

The University of Kentucky Research Foundation of Lexington, Kentucky, in partnership with LG&E Energy Corporation of Louisville, Kentucky, will design, construct, and demonstrate an advanced coal-ash beneficiation processing plant at the 2,200 MW Ghent Power Plant in Ghent, Kentucky. This plant represents the next generation in coal utilization by-product (CUB) beneficiation in that it addresses the entire CUB stream and generates a variety of useful products. The process, based on hydraulic classification and froth flotation technology developed at the University of



Ghent Power Station

Kentucky Center for Applied Energy Research, will use coal by-products to make one product reducing CO₂ emissions in cement-making operations. The process produces pozzolan, a material that can be used to replace a portion (up to 30%) of the portland cement used to make concrete, while achieving better strength and performance than currently available using unprocessed ash. In addition, this project will also use a beneficiated coarse ash to produce lightweight aggregate that will be suitable for use in concrete masonry units, such as blocks, or used as graded fill-sand for construction applications. Also, the unburned carbon product will be concentrated and used as a supplemental fuel. Lastly, this process also generates very fined-sized material (~3 to 4 μ m median particle size) suitable for use as a polymer filler or specialized pozzolan. Overall, the project will generate high-value and consistent quality products with the target of total CUB utilization. The project concept is depicted in the figure on the following page.

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TOTAL ESTIMATED COST

\$ 8,916,739

COST SHARE

DOE	\$ 4,450,163
Participant	\$ 4,466,576

ADDITIONAL TEAM MEMBERS

LG&E Energy Corp.
(collaborator)
**University of Kentucky Center
for Applied Energy Research**
(collaborator)

ESTIMATED PROJECT DURATION

48 months

CUSTOMER SERVICE

800-553-7681

WEBSITE

www.netl.doe.gov

Benefits

Throughout the United States, many coal-fired power plants utilize ash-settling ponds and in many cases are required to pay for offsite landfill disposal. This project addresses the use of all of the CUBs from the plant to produce saleable and valued products. Finding a beneficial use for these materials will reduce the need for the creation of new ash settling ponds, extend the life of existing ponds and potentially eliminate the need for creating new ash settling ponds at coal-fired power plants. One of the important benefits associated with this project is that the 156,000 tons per year of high quality pozzolan, to be produced from coal by-products, will displace an equivalent amount of portland cement. Manufacturing portland cement results in release of approximately 1 ton of CO₂ per ton of cement produced. As such, this project represents a potential greenhouse gas offset. Cement making currently releases about 47 million tons per year of CO₂ in the U.S., making it one of the highest generators of CO₂ of any industrial process. Therefore utilization of existing coal ash for this purpose offers a new pathway for reducing future CO₂ emissions related to the production of cement.

